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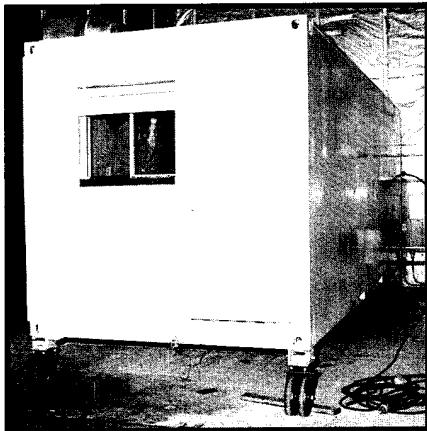


# TECHNOLOGY TRANSFER TODAY

*Gaining the Competitive Edge*

A Publication of Opportunities for Partnerships Between the NAWC and Industry

Vol. I, No. 3 Summer 1995



The MRC-1000 has an explosion-resistant passthrough window.



The MRC-1000 has hazardous material storage capabilities.

## SHIELDS ENVIRONMENTAL CORPORATION ANNOUNCES A MOBILE HAZARDOUS MATERIAL ENVIRONMENTAL ISSUE AND CONTROL CENTER

Shields Environmental Corporation and the United States Navy introduce a jointly designed, developed, and patented Mobile Hazardous Material Environmental Issue and Control Center (MRC-1000). Developed for industrial plants, household hazardous waste programs, and a variety of private and governmental industry uses, the MRC-1000 (Mobile Reuse Center) allows for total inventory control and accountability for hazardous materials. Shields and the Navy are working together under a Cooperative Research and Development Agreement (CRADA) to further enhance environmental technology and safety concerning hazardous material storage, transportation, issue, and control. The control extends from consolidation and supply to reutilization of material and waste consolidation. The MRC-1000 creates a minimum generation of hazardous material with the maximum amount of savings. The unit saves money by being a single point of control and by being relocatable at multiple sites. The tight issue and control saves money by not allowing hazardous material to go past its shelf life.

The MRC-1000 has the option of wheels and a tow bar, or the option of a trailer. These options provide mobility for the unit. Receiving and issuing are accomplished with the passthrough explosion-resistant window. The computer station allows for bar coding and hazardous materials management on a continuous basis and meets or exceeds environmental regulations for storage and transportation of hazardous materials. The unit meets life safety codes for personnel to work inside. The fluorescent lighting creates greater visibility within the unit, and the patented seismic secondary containment shelving allows for adjustability of the materials and for safeguards against the movement of the mobile unit. If you want to control your hazardous materials, save money, have flexibility, and be on the leading edge of state-of-the-art environmental management, the MRC-1000 is for you, your plant, or your household hazardous waste program. For further information, please contact Mike Sullivan at the Technology Development Office at (805) 989-9208.

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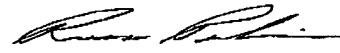
## From the Director, NAVSTO

As Technology Transfer Today enters its third issue, we are pleased to announce the signing of the NAWC Technology Transfer Board (TTB) Charter and the NAWC ORTA Functional Description. These documents reinforce the technology transfer initiative throughout the Navy and the Technology Transfer ( $T^2$ ) community.

The TTB charter implements a cohesive NAWC domestic technology transfer program that will identify and recommend unified NAWC goals and objectives consistent with mandated legislative requirements and the NAWC's partnership initiatives. The TTB is comprised of NAWC ORTA's and ad hoc members, and meets throughout the year. Through joint interaction and leveraging of resources,  $T^2$  offices better fulfill their mission which is to increase awareness of NAWC technical capabilities and to develop partnerships with industry, academia, and other government agencies to maximize the benefit of Naval Aviation.

The ORTA Functional Description establishes an Office of Research and Technology Applications (ORTA) at each NAWC geographic site. These ORTA's will be the principal technology transfer point of contact for each site.

With NAWC technology transfer progressing rapidly, the newly released TTB charter and ORTA Functional Description will solidify the efforts of the program and provide increased direction to all involved.



Russel Perkins

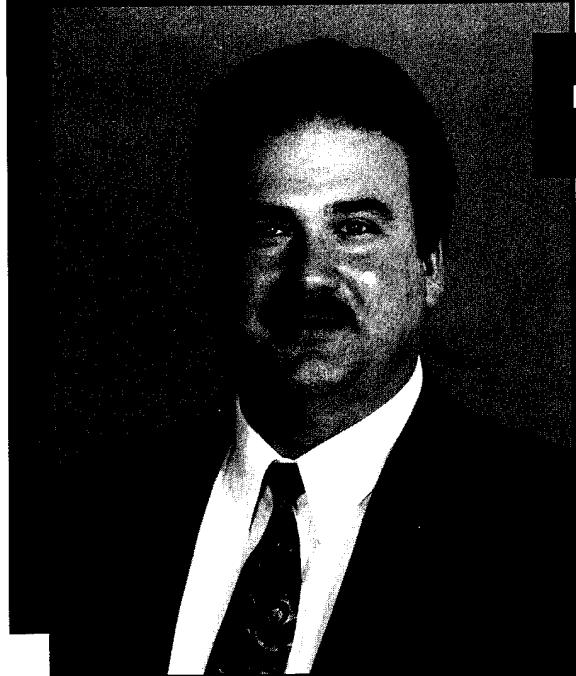
## NAVSTO AND ONR MEMBERS PROVIDE DIRECTION FOR TTB

NAWC ORTA's gathered in Washington, D.C., recently for the NAWC/NAVSTO Technology Transfer Board (TTB) meeting to discuss Naval Aviation Science and Technology Office (NAVSTO) organizational structure, Office of Naval Research funding requests, and the Naval Air Warfare Center Aircraft Division Indianapolis (NAWCADIND) Fighter Support Experiment with Japanese Industry initiative.

Mr. Russel Perkins presented the NAVSTO organizational structure to the TTB. He presented an overview of the TEAM strategy, which includes development of an integrated science and technology team. The group discussed expanding the current S&T goal to include technology investments across a large numbers of users. Mr. Perkins discussed technology transfer as a component of an externally directed team and urged the TTB to begin planning for CRADA signature authority procedures and a technology transfer structure when the TEAM stands up in 1997.

Katherine Drew of ONR announced that the funding available to NAWC sites would be increased from last year, despite the fact that ONR has less money for distribution to all laboratories.

Representatives from NAWCADIND were present at the TTB meeting to discuss their Fighter Support Experiment with Japanese Industry. Alan Impicciche, NAWCADIND, and James Wheeler, Director, International and Asia-Pacific Studies, Hudson Institute, presented a briefing on the program, which is the first cooperative development of a weapons system between the United States and Japan. The program emphasizes the transfer of manufacturing processes, as well as technologies themselves, and is an example of spin-on rather than spin-off or dual-use. The project is currently looking for sponsors to consider transitioning specific technologies from the FS-X to other Navy systems. Two pilots will be conducted: composites and electronics. TTB chairperson Angel Carreras, Jr., reviewed other initiatives at the meeting and made plans to gather again to discuss establishing a Technology Transfer Program Process for overall use throughout NAWC.



**Angel Carreras, Jr.  
NAWC Aircraft Division  
Warminster, PA**

## **WHO'S WHO IN NAWC/NAVSTO TECH TRANSFER**

*Technology Transfer Today is proud to offer in each issue a biography of one of the champions of technology transfer throughout NAWC/NAVSTO. Each quarter, a different technology transfer advocate will be highlighted, featuring his or her background as well as T<sup>2</sup> goals. This issue features Angel Carreras, Jr., NAWC/NAVSTO Technology Transfer Board Chairperson and ORTA at the Naval Air Warfare Center Aircraft Division Warminster.*

Angel Carreras, Jr., has been a full-time ORTA and Technology Transfer (T<sup>2</sup>) Program Manager at the Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) since February 1993. Since being appointed as ORTA, he has taken the lead in coordinating with ORTA's at all eight NAWC facilities to form the NAWC/NAVSTO Technology Transfer Board (TTB) and is currently serving as TTB Chairperson. As the chairperson, Mr. Carreras works closely with the NAVSTO Chief Scientist/Technologist to address corporate partnership development initiatives.

Mr. Carreras has developed a

proposed organizational structure for the TTB and developed a NAWC/NAVSTO T<sup>2</sup> charter and standard Cooperative Research and Development Agreement (CRADA) signature authority procedure. He has successfully negotiated numerous CRADA's and marketed NAWCADWAR laboratory technology expertise in an effort to develop commercial partnerships. He also has worked closely with state, regional, and county organizations, as well as local defense contractors to form partnerships that focus on technology transfer and economic development in the Pennsylvania/Delaware/New Jersey tri-state region.

He authored a NAWC Aircraft Division Patents Available for Licensing document and a NAWC Technology Transfer Training Course. As an advisory member of the ONR-sponsored Technology Transfer Training Advisory Committee, Mr. Carreras is assisting in the development of a Navy Technology Transfer Training program.

Prior to his ORTA assignment, Mr. Carreras was an electronics engineer in the NAWCADWAR Surveillance Radar Branch. Under the synthetic aperture radar (SAR) program, he was instrumental in working with other Federal agencies such as the EPA, DEA, FAA, and NASA in developing non-military applications for the SAR. He began working at NAWCADWAR in 1985, while still at Widener University as an engineering co-op.

Mr. Carreras has a BS in Electrical Engineering from Widener University. He is a graduate of the Executive Master of Science in Engineering program at the University of Pennsylvania as well as a member of the Moore Fellowship Program in Management and Technology. This multidisciplinary program combines courses in advanced technologies with courses in business

and economics. Its purpose is to develop leaders in the development and commercialization of emerging technologies.

## **PARTNERSHIP AGREEMENTS STEM FROM INDUSTRY DAY CONFERENCE**

The NAWC annually hosts two "get to know us" conferences to acquaint small businesses with their technologies. NAWC Aircraft Division hosted the East Coast conference late last year at the Warminster (NAWCADWAR) facility. About 100 participants came to learn more about technology transfer opportunities.

Over 20 companies expressed immediate interest in teaming with NAWCADWAR. To date, 10 of these companies have initiated contact by signing "mini-CRADA's" (Cooperative Research and Development Agreements) with NAWCADWAR and Ben Franklin Technology Center of Southeastern Pennsylvania. These mini-CRADA's allow for a forum for the interested non-Navy partner to meet with Navy technologists to discuss their ideas.

Two companies have moved beyond the mini-CRADA's into actual CRADA's. Fiber and Sensor Technologies has recently signed an agreement with NAWCADWAR to develop optical fiber sensors for intelligent monitoring of materials processed in a hot isostatic press. Materials Resources, Inc., is in the process of negotiating a CRADA and a patent licensing agreement.

The remaining companies are in the negotiating stages of their mini-CRADA's. The hard part is over, however, as the initial contact and identification of technologies are complete and discussion has begun.

## CHALLENGE GRANTS HELP TRANSFER TECHNOLOGY INTO CLASSROOMS

In a recent presentation of a new program entitled "Challenge Grants for Technology and Education," the U.S. Department of Education reported that money being spent on new educational technologies is not reaching educational facilities around the world. The Department states that "in an information society, we have factory era schools," and that blackboards and chalk continue to be the means of communication in the classrooms rather than newly developed technologies. The Department of Education offered change in the form of Challenge Grants. These Challenge Grants will make way for modern technology to enter the educational system, eventually providing "interactive, high performance learning environments" throughout the world.

The Challenge Grants will support the development and creative use of technology and help to improve learning efficiency in the community, at an affordable price. There are no geographic limits to the Challenge Grants; underprivileged schools have the same opportunity to receive them as

privileged schools. They link schools and colleges to libraries, businesses, and museums around the world, thus creating "virtual learning communities."

The White House Task Force on Learning and Technology, an interagency effort to share new technologies with education, is responsible for laying the groundwork for the Challenge Grants program. They are instructed to build on all possibilities of technology and determine how they will be used in education. The goal is to create these "virtual learning communities" through the combined efforts of industry, government, and parent. Janet Weisenford, ORTA at the Naval Air Warfare Center Training Systems Division and a member of the White House Task Force, attended the announcement upon invitation of Vice President Al Gore. Ms. Weisenford joined the Task Force at the request of the Secretary of Defense due to her extensive efforts towards "technology in education" in the past. She feels this program is important to her work because it "presents an opportunity to leverage federal investments in military

training for public education. The military relies on the public educational system as a supplier for both military and civilian personnel and we therefore benefit from enhancements to this system." The Challenge Grants program will work to prevent a future in which only the communities with an overabundance of funding can have access to the vast technological resources, thus giving the low-income communities a fair chance. To ensure this, it was announced at the meeting that the Secretary of Education will give priority to applications from those who are responding creatively to the information age requirements of all learners. NAWCTSD provided technical support for the Challenge Grant Program. Mr. Randy Oser, a TSD research psychologist, shared his expertise with the program.

For more information, please contact: Interagency Tech Task Force, U.S. Department of Education, 600 Independence Ave., S.W., Washington, D.C. 20202-5544, Phone (202) 708-6601.

### NAWC APPROVES TECHNOLOGY TRANSFER BOARD CHARTER

The Naval Air Warfare Center (NAWC) recently approved the charter for its Technology Transfer Board. The charter implements a cohesive NAWC domestic technology transfer (DTT) program that will identify and recommend unified NAWC goals, objectives, and policies for DTT. These goals, objectives, and policies will remain consistent with mandated legislative requirements and the NAWC's partnership initiatives. The overriding purpose of the TTB will be to maximize the benefit for Naval Aviation. The TTB is composed of permanent and *ad hoc*

members. Each NAWC geographic site and/or competency level will have one permanent voting member, who must be an Office of Research and Technology Applications (ORTA) representative. The Naval Aviation Science and Technology Office (NAVSTO) Chief Scientist/Technologist and a NAVSTO Office of Naval Research (ONR) representative will also be permanent voting members. Each permanent voting member may designate an alternate. *Ad hoc* members may include representatives from Human Resources, Public Affairs, Patent/General Counsel, and other disciplines, if required.

The chairperson of the TTB is the lead NAWC ORTA and acts as the primary interface between the TTB and the NAVSTO Chief Scientist/Technologist, as well as the TTB and the ONR. Through this chairperson, the TTB will establish quantifiable goals and

objectives for DTT consistent with mandated legislation and the overall objectives of Naval resources among all NAVSTO/NAWC ORTA's. The TTB is also responsible for defining and establishing DTT policy and DOD and Navy directives and instructions consistent with technology transfer legislation.

The chairperson and the TTB will provide coordination among all NAWC ORTA's and alternates in implementing initiatives for a joint proactive NAWC DTT program. These initiatives may include personnel exchange programs, technical assistance programs, shared data bases, joint participation in trade shows, etc.

TTB meetings will be held no less than two times per year, the location of which will be determined by the chair.



Left to right, Sophie Dodge, President, Ridgecrest Chamber of Commerce; Dr. Robert Slater, President, Inyokern Chamber of Commerce; Rear Admiral Newman; Kevin Corlett, Ridgecrest Mayor; Roy Ashburn, Kern County Supervisor

## NAWCWPNS CHINA LAKE INITIATES RELATIONSHIP WITH LOCAL TECHNOLOGY INCUBATOR

The Ridgecrest Redevelopment Agency (RRA) of Ridgecrest, California, and Quoin, Inc., a local technology development business, recently signed a contract to manage the Ridgecrest Business and Technology Incubation Center (RBTIC).

The contract defines Quoin's role as manager of an incubator for new technology-based businesses. RBTIC is designed to serve as a springboard for new small businesses, allowing these businesses to reside in the incubator site. Here, they are provided with supplies, office space, copy machines, FAX machines, phone services, and Quoin's business expertise and guidance. Quoin will assist new small business incubator tenants in writing business plans, developing budgets, locating needed technology resources, and performing marketing surveys. Quoin will also provide the interface between the incubator tenants and the technology resources of the Naval Air Warfare Center Weapons Division

(NAWCWPNS), China Lake, California. NAWCWPNS China Lake will contribute to the incubator project by providing access to U.S. Navy technology resources. A memorandum of understanding (MOU) between the City of Ridgecrest and NAWCWPNS was signed on May 27, 1993, to provide access for the incubator tenant companies to China Lake technologies, technologists, and facilities on a noninterference basis. A Navy Potential Contractor Program (NPPC) agreement was immediately initiated between NAWCWPNS China Lake and Quoin to assure Quoin ready access to information about NAWCWPNS China Lake and U.S. Navy technologies and technologists. Cooperative Research and Development Agreements (CRADA's) will be established with Quoin and the individual incubator tenant companies as the incubator grows and the need is identified. The incubator contract is for 3 years, with two 1-year extensions possible.



Rear Admiral William Newman, right, and Ridgecrest Mayor Corlett signed a memorandum recently which will allow for access to marketable defense technology.

## NAWCWPNS TO HOST ANNUAL TECHNOLOGY BRIEFING

Annually, the Naval Air Warfare Center Weapons Division (NAWCWPNS) sponsors a Technology Briefings to Industry Conference. The primary purpose of this conference is to provide private industry and other government agencies a chance to review and critique the latest technical developments at NAWCWPNS. These developments occur in NAWCWPNS technologies, facilities capabilities, and the test and evaluation ranges. The conference also serves to attract industry interest in cooperative technology transfer opportunities at NAWCWPNS. One highlight at this year's conference will be the establishment of the Ridgecrest, California, and NAWCWPNS incubator (see adjacent article). This will demonstrate their strong commitment to work with RBTIC to identify NAWCWPNS technologies for transfer to incubator tenant companies. This year the conference will be held at the China Lake site on October 17-19, 1995.

## PACE OF PARTNERSHIPS THROUGH CRADA's INCREASES

*As technology transfer via CRADA's becomes the norm rather than the exception, Technology Transfer Today is pleased to highlight approved CRADA's from various NAWC facilities throughout the country.*

### EJECTION SEAT SURVIVAL

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) recently signed an agreement with CONAX of Florida Corporation to conduct structural qualification verification on the Canadian DND CT-114 Tutor Ejection Seat Survival Kit Containers.

CONAX recently modified the CT-114 Tutor Ejection Seat Survival Kit Container Assembly P/N 8440356-1 under a Canadian Air Force contract. The modified survival kit container is an improvement of the existing container. The new container includes an additional ply of fiberglass over the inner and outer surfaces of the container lid. The purpose of these additional layers of fiberglass is to improve the overall strength of the survival kit container. The seat survival kit container was also modified to include additional support internally in the vicinity of the cutouts. The purpose of this modification is to minimize the possibility of cracks developing during egress and ingress.

Due to the modification of the survival kit container, structural integrity tests are required. Military Standards require that "ejection tests shall be conducted under simulated emergency conditions on an ejection tower." It is also required that crash-load-type tests be conducted and that the seat survival kit operates properly after being subjected to ejection tests and crash-load-type testing.

This testing will be conducted at the NAWCADWAR ejection tower and horizontal accelerator facility. NAWCADWAR shall provide personnel and test equipment to carry out two ejection tower tests and four horizontal accelerator tests to evaluate the CT-114 Tutor Ejection Seat Survival Kit. CONAX will provide funding, test representatives, a CT-114 ejection seat, sufficient seat survival kit test articles, and related survival equipment to

conduct two ejection tower tests and four horizontal accelerator tests. The program covered by this CRADA will use the experience of both partners to evaluate the capability of the modified seat survival kit to withstand ejection and crash-type loads.

### SHAPE MEMORY ALLOYS

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) signed an agreement with Texas Engineering Experiment Station (TEES) to conduct an evaluation of the thermophysical properties of shape memory metal matrix composites.

Shape memory alloys have been a major element of the intelligent materials and structures research effort. Many applications call for the embedding of shape memory materials within structural components to sense and/or control the mechanical response of structures. The design of shape memory structural and mechanical components requires a fundamental knowledge of the behavior of these materials. However, very little work has addressed the mechanics of the interactions between the shape memory alloys and the host materials they are embedded within. To address this problem, TEES and NAWCADWAR plan to conduct a joint research effort to develop and test shape memory metal matrix composite materials.

### METAL MATRIX COMPOSITES

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) recently signed an agreement with the University of Pennsylvania to conduct an evaluation of the thermophysical properties of shape memory metal matrix composites.

The Crew Systems Engineering Competency of NAWCADWAR and the Bioengineering Department of the University of Pennsylvania jointly proposed for and received an award of a National Highway Traffic and Safety Administration (NHTSA) contract for biomechanics research (DTNH 22-92-4-07339). This effort will provide injury criteria so that the NHTSA may make informed upgrades of FMVSS 214. The primary issues to be studied are side impact and the injury-causing components of side impact, as well as the correlation of new biomechanical

instrumentation with trauma. The data will be immediately used by the Navy in its aircrew systems injury prevention and protection mission.

### OPTICAL FIBER SENSORS

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) recently signed an agreement to develop optical fiber sensors for intelligent monitoring of materials processed in a hot isostatic press with Fiber and Sensor Technologies (F&S).

Titanium matrix composites (TMC's) reinforced with continuous filaments exhibit high interlaminar shear strength, high fracture toughness, and high transverse tensile strength. They are well suited for structural elements subjected to fatigue loading in high temperature environments. For this reason, TMC's are attractive candidates for aircraft propulsion components, such as turbine blades. However, the complex processing requirements for TMC's result in high costs for such components, limiting the application of TMC's to uses where cost is a minor consideration. By decreasing costs, TMC technology may be applied in larger commercial markets. The most promising avenue for reducing costs appears to be by optimizing the processing to reduce scrap, reduce energy costs, and improve uniformity. The use of intelligent processing has been hindered by the lack of suitable process feedback sensors and instrumentation that can survive the harsh processing environment.

NAWCADWAR is currently funded to perform work in the area of intelligent processing of materials by HIP (IPM-HIP). The fiberoptic sensor system proposed by F&S has the potential to provide NAWCADWAR a more direct means of measuring in situ strain on the metallic processing can, which will increase the affordability of IPM-HIP components by reducing sensor costs and the time associated with sensor calibration. The feasibility of this optical-based IPM system provides F&S with the opportunity to pursue a Phase II SBIR program with ARPA in which this work would be developed for NAWCADWAR and other dual-use applications. More importantly, this work will lead to the development of a commercial fiberoptic IPM system.



Guy Dilworth greets the Canadian conference attendees.

## CANADIAN TECHNICAL INFORMATION EXCHANGE

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) recently hosted the Canadian Technical Information Exchange Conference, sponsored by the Canadian Defence Production Department. Fifteen Canadian businesses sent representatives to NAWCADWAR to present their technologies to the resident scientists and engineers.

The morning provided NAWCADWAR an opportunity to familiarize the Canadian representatives with NAWCAD research and development initiatives and technical capabilities and facilities. Mr. Guy Dilworth, Deputy Commander, NAWCAD, and Mr. Angel Carreras, Jr., Technology Transfer Program Manager, NAWCADWAR, welcomed the guests, and Mr. Georges Lemieux, Consul, Canadian Defence Production Office, provided opening remarks. Dr. Ken Green, Office of Science and Technology, NAWCADWAR, presented an overview of NAWCAD capabilities, followed by a Canadian overview given by Mr. Michael Clark, Director of Armament, Department of National Defence, Quebec City. Upon conclusion of the briefings, the industry representatives were given the opportunity to exhibit their technologies and provide materials to interested NAWCADWAR employees.

A luncheon was held for the Canadian exhibitors and NAWCADWAR scientists and engineers. This luncheon provided a forum for the Canadian representatives to give a

5-minute brief about their company and capabilities. This luncheon proved to be an essential aspect of the conference as it provided a relaxed setting in which discussions could flourish. Companies represented at the luncheon and at the displays included Omega Simulation, Oracle Computing, Pratt and Whitney Canada, Inc., and Western Avionics, among others.

The afternoon was reserved for NAWCADWAR facility tours. The guests were invited to tour the centrifuge and observe training of Navy pilots, as well as "behind the scenes" efforts necessary to perform the training. The next tour site was the radar and surveillance laboratory, and the final stop was the night eyewear laboratory where pilot headgear was demonstrated.

## NAWC COMMANDER APPROVES ORTA FUNCTIONAL DESCRIPTION

The Naval Air Warfare Center (NAWC) Commander approved the Office of Research and Technology Applications (ORTA) Functional Description recently. This functional description establishes and maintains an ORTA representative at each NAWC geographic site.

This description establishes ORTA's as the focal points for all technology transfer initiatives between their NAWC facility and industry, academia, and all state and local governments. They will negotiate Cooperative Research and Development Agreements (CRADA's), patent licensing agreements (PLA's), and personnel exchanges, as well as establish and maintain a data base to track technology transfer initiatives.

ORTA's are also responsible for communicating awareness

of Department of Defense/Department of the Navy domestic technology transfer programs and initiatives, as well as Federal technology transfer legislation. They will participate, where feasible, in regional, state, and local programs designed to facilitate the transfer of technology. Through these programs and other initiatives, information on Federally owned or originated products will be disseminated.

ORTA's are also required to cooperate with and assist the National Technology Information Service (NTIS), the Federal Laboratory Consortium (FLC), and other organizations which link R&D resources of the Federal government as a whole to potential users in state and local governments and private industry.

# **Calendar of Events**

**Far West Regional FLC Meeting**

**August 15-16, 1995**

**Portland, OR**

**FLC Executive Committee Meeting**

**August 22-23, 1995**

**Washington, DC**

**FLC Mid-Continent Regional Meeting**

**September 20-21, 1995**

**Los Alamos, NM**

**Technology 2005**

**October 24-26, 1995**

**McCormick Place**

**Chicago, IL**

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